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Scarcity of Food—A Startling Prediction.

We presume that all of our readers have heard of Liebig, the learned German chemist, who has spent a lifetime in the application of chemical science to practical agriculture, and to other matters relating to domestic economy. Equally distinguished in the agricultural world, stands J. J. Mechi, an English farmer, celebrated for his achievements in farm draining, and for the introduction of a system of pipes that traverse his land in every direction, laid below the surface, through which are forced liquid manures by the operation of a powerful steam engine, acting like the heart in the living organism, propelling the vital fluid to the remotest parts of the system. The astonishing results of this method, watering and manuring at the same operation, led Mr. Mechi to address a letter through the *London Times* to the celebrated Liebig, asking his opinion in regard to the value of the sewerage of towns to the application of farm lands.

Professor Liebig has replied fully to the questions asked; and has embraced the opportunity to express his views in regard to the rapid deterioration of the natural elements of fertility in soils; and of the probability, at no distant day, that the capacity of the agricultural lands of the world will be inadequate to supply its inhabitants with bread. He shows that the corn-producing power of the civilized, cultivated countries of the globe, is rapidly becoming exhausted; and but for the immense quantity of bones, and the guano that has been applied to the lands, the decline would have been more rapid and more marked. He further asserts, that if the consumption of guano is continued at the present rate, the supply from all sources will be entirely exhausted within the period of twenty five or thirty years at the furthest. In view of these facts, he predicts, that unless war, or pestilence, or famine, or extensive emigration, diminishes greatly the inhabitants of the older countries, famine must necessarily follow. He appeals to the history of other countries for the proof of this fact. He says, that not one of all those countries which have produced corn for other countries, have remained corn-markets; and that England has contributed her full share towards rendering *unproductive the best lands of the United States which have supplied her with corn, precisely as old Rome robbed Sardinia, Sicily and the rich lands of the African coast of their fertility.* (We will remark here that the term corn, as applied by the Europeans, is always to be understood WHEAT or small grain.)

Did these assertions come from a less distinguished scientific man, they would not command so serious consideration; yet the statistics of the grain-growing regions of our own com-

paratively new country, afford conclusive evidence of the rapid deterioration in the productive capacity of the soil.

In an article which we gave in a late number of the *Valley Farmer*, upon this same question of the value of city sewerage, we presented the same facts and arguments as those set forth in the reply of Baron Liebig. And, although the direct question of the value of this manurial substance does not now interest or apply to our Western farmers, yet the *great principle upon which these arguments are based is one of vital importance to them.* And finding the opinions advanced by us in the article referred to, and those expressed in numerous other articles that we have written from time to time, so fully confirmed by this distinguished man of science, we shall give our readers the benefit of the letter in full in our next number.

Under the operation of the corn-laws of England, previous to 1847, when they were repealed, that country was only enabled to supply the demand of her own population for wheat by heavy protective duties, which so advanced the price of bread that it became a heavy burden to the industrial classes; and which led to its final repeal. But, as soon as these duties were removed, other countries of Europe, and the United States, could furnish the inhabitants of England with bread at less cost than the British farmer could raise it; and this led to a thorough revolution in the system of farm husbandry in that country. The rearing of cattle, fed upon turnips and other green crops, was found more profitable, and took the place of wheat; and so diminished the supply, that large demands are now made upon other countries to meet the deficiency.

It is an alarming fact, that the same system that has required centuries to exhaust the productive capacity of the soil of England, has, in so short a time, reduced the soil of some of the States of this Union to an alarming degree of sterility; and even in the newer States, the result of the same wasteful course of cropping is apparent in the diminution in the acreable return of the principle grains cultivated. This is abundantly proved by a comparison of the census returns. It is not that our land is more readily exhausted than that of England, that it has been reduced in so short a period; but it is that land is so abundant and cheap, that not the slightest regard is paid to retaining its fertility, but the object seems to be to wear it out in the shortest possible time and remove to new land, upon which to commence the same destructive course. While the inhabitants of all Europe, and those of the old States of this Union, are spending millions of dollars annually for guano, in order to restore these wasted lands to some degree of productiveness, our own Western farmers see going to waste, annually, thousands of tuns of concentrated manures, in the form of blood, heads, bones and other offal from the slaughtering establishments where packing is carried on. While England finds it necessary to transport cargoes of bones from Germany and other parts of Europe, and guano from the Islands of the South Sea, surely our Western farmers and gardeners should not see the blood of their animals flow in streams and run to waste into the rivers within sight of their own doors, without resorting to some means to preserve so valuable a fertilizer. This blood and these bones, and the pork that goes to feed the operatives of the great manufacturing districts of the world, are but the concentrated elements drawn from the soil that produced them. This continued draft upon these elements, without some effort to restore them, must lead to the fearful consequences so clearly demonstrated by this distinguished chemist.

Testimony in favor of Under-Draining with the Mole Plow.

A writer from Madison county, Ohio, gives his experience with draining by this cheap process, which puts the matter in a more favorable light than we were prepared to expect. We have frequently expressed our views on this subject, and have not failed to remind our readers of one important fact, which must be taken into consideration when adopting this mode of under-draining in preference to using drain-tile; and that is, the character of the sub-soil where the mole plow is to be used. A somewhat tenacious soil is necessary to give that degree of firmness to the drain to cause it to remain open. With this precaution, we will give the extract referred to:

"I know of some ditches that have been in operation in this country near three years, and the unanimous testimony thus far, is, that they *are now better* than when first completed; and that, instead of crumbling and filling (as many would have us believe would be the case), they improve with use and age; and now discharge more water and more freely *than at first.* Now, this cannot be ascribed to great falls, thereby giving the water a strong forward impetus. On the contrary, this county is notoriously level,

and particularly those sections that have been ditched, with but little descent—mostly natural prairie lands; and yet these same ditches, many of them, have furnished an abundance of clear good water for stock, even during the greater part of the extreme drought of the past summer, when wells, stock-pools and running streams failed in part and entirely—and this supply, too, coming from fields that have hitherto been cultivated in corn with fair results, and were but a few years since considered sufficiently drained by natural surface drainage. But our farmers now find that the more under-drains through their fields, the better results and returns for labor; and that either wet or dry summer crops mature earlier and better when the ditcher has been most employed."

This is the result of several years' experience in this mode of draining, and affords encouragement to all those farmers occupying level, wet lands, as many thousands of acres of prairies are, and which may all be drained with great advantage in this way, where the soil is of the character suited to this mode of draining. Land-draining is to constitute the next great step towards improved farming, and we are pleased to extend any evidence that will give encouragement to it. Where the mole plow cannot be used to advantage, facts will soon be afforded by those who have employed the more expensive mode of draining with tile, to induce every enterprising farmer to adopt the system.

EFFECT OF ARTIFICIAL LIGHT ON VEGETATION.—Every one is aware of the effect of natural or sun-light on vegetation—that without this, or some equivalent, no healthy vegetable growth can be produced. Recently, in answer to the subject (the effect of *artificial* light on growing plants), a correspondent of the *London Builder* states: "I planted vegetables in a place where daylight could not penetrate, over which I suspended a paraffine oil lamp, with a reflector to throw the light upon the plants. They have grown up a beautiful dark-green. I have also lighted a green-house with lamps every night; and find it not only increases vegetation, but gives a beautiful deep tinge to the plants."

LARGE RED CLOVER.—J. W. S., Walnut Grove, Mo. wishes to be informed as to the comparative value of the Large Red Clover and the common variety. There is a large variety of the red clover grown in New York and Pennsylvania, and is esteemed by some farmers of those States; but we do not learn that it possesses any advantage over the medium or common kind usually grown in the West. We have introduced seed of the large kind for some of our farmers, but it seems not to have attracted much attention. As a renovator of the soil, it might produce a heavier crop; but for hay or pasturage, we should prefer the common red clover. We do not think any of our seedsmen now keep it distinct from the other.

AN IMPROVED CHEAP BAROMETER FOR FARMERS.

To the mariner, with his vessel richly laden with human lives, and a freight list estimated in value by hundreds of thousands, the use of a well-adjusted and reliable barometer constitutes one among the nautical instruments of the greatest importance. While the surface of the ocean is still as smooth as a mirror, and not a cloud is to be seen above the horizon, the barometer, as a faithful monitor, gives notice sometimes hours in advance, of the approach of the most terrible storms and hurricanes, which enables the officers in command to shorten sail and put the vessel in the best possible condition to meet the fury of the tempest. Thus, by the observation of this little instrument, thousands of human lives and millions of money are annually saved.

To the farmer, in a pecuniary sense, the barometer is scarcely less important. The value of two of the greatest staple crops—grain and hay—depends much upon the condition of the weather at the time of harvest. If cut previous to a long continued storm, they are frequently much damaged, and sometimes rendered almost worthless. Much of this great loss, which, throughout the farming districts of the United States, amounts to millions of dollars annually, might be saved by a timely warning of the approaching storm. With a good barometer, after a few weeks observation of its varied movements, and the attendant changes in the weather, the coming storm is foretold with a good degree of certainty.

Until within a few years, the only barometers in use, were those composed of a mercurial column, enclosed in a glass tube, which were constructed in such a manner that none but experienced persons could handle them without great liability to destruction; for, when changed from a vertical position, the immense pressure of the atmosphere will frequently rush in at the base, with such force as to burst the upper end of the tube, and instantly render them worthless. These, of late, have been considera-

bly improved; yet they are not so convenient for the farmer as the metallic barometer of more recent invention. The first of these was invented in Paris, France, by M. Vidi, and is known as the Anaroid Barometer. This form of barometer is perfectly portable, occupies but a small space, and is easily carried in a trunk or in the hand; and, besides answering all the purposes of a stationary barometer, is a most useful and interesting instrument in traveling over hilly or mountain districts for indicating the various changes of elevation, and measuring with great accuracy their height. But such is the activity of the mind and inventive powers of American genius, that no sooner is an important invention given to the public than improvements are speedily made upon it, until further improvement is hardly possible.

Within the last year, Mr. Victor Beaumont, an ingenious machinist and engineer of 175 Centre Street, New York, has made an improved metallic barometer (patented June 14th, 1859), that is admirably suited for farmers' use, and sold at a price that all may have them. It is a neat instrument, but 4½ inches in diameter, made to hang against the wall like a small time-piece. It has a dial and index hand, covered with glass, and may be sent with perfect safety to any part of the country. We have had one of these hanging by the side of several others, both the Anaroid and old mercurial barometers, and have watched their varied movements together for several weeks; and we find it to be sensitive to the slightest variations of the atmospheric pressure; and having a wide range of movement on the dial-plate, which is divided into inches and tenths, the least change is readily indicated.

We are so well pleased with this form of barometer, and its perfect adaptation to the use of the farm, that we recommend it with confidence to all. We visited several times the shop of the manufacturer, and saw them in all stages of construction, and find them made upon a plan that is substantial and not liable to get out of order.

We think that the dealers in seeds, agricultural implements and books, should keep a stock of these barometers on hand for the supply of the farmers.

AMERICAN JOURNAL OF SCIENCE AND ART.—This valuable publication enters upon its thirty-ninth year. From its age and character, and the great increase of population and the progress of science in the United States it should have a wide circulation. It has no equal in value and importance. The names of its conductors and contributors afford ample proof of this fact. Published by Professors Silliman and Dana, New Haven, Connecticut.

TRENCH AND SUB-SOIL PLOWING.

Gardeners, generally, are much better cultivators than farmers. The reason for this is, many of our best and most successful gardeners and nurserymen were educated to their business either in England or Germany, where the advantages of a thorough preparation of the soil are known and appreciated. Trenching the soil is chiefly confined to this class of cultivators. By them, trenching is mostly performed by hand with the spade. This mode of trenching is too expensive for farm crops, and hence the invention of trench and sub-soil plows. With a good team of cattle or horses, this affords a good preparation for field crops, and is done with little extra expense beyond the ordinary plowing; and the extra labor of plowing is fully saved in the subsequent cultivation, besides the great increase of the crop. The soil of our Western lands is generally deep, and may be plowed to any reasonable depth without reaching a poor sub-soil. On these lands, the farmer can reap the fullest benefits of trench or sub-soil plowing. It is a great protection both against an excess of rain and against drought. When heavy rains fall upon compact land, where the surface has been plowed but four or five inches deep, the mellow portion of the soil suddenly becomes saturated, and the excess of water must run off to the lower levels. In this way it carries with it much of the richest portion of the soil. But if the land has been broken up and pulverized to the depth of ten inches or a foot, a much larger quantity of water would be absorbed; and with the additional weight of the body of the mellow soil, the tendency to wash is much diminished. In dry weather, the advantages of a deep preparation are equally apparent. All the rain that is absorbed by the lower portions of the soil is stored up, ready to be given off to the growing crop by the capillary action of the prepared soil. A larger proportion of air and heat are imparted to the roots of the plants, as well as a more lively action of the gaseous and chemical agents which nature has rendered essential to their perfect development.

Lands that have been repeatedly plowed to but a few inches in depth, and crop after crop taken from this shallow surface, must of course exhaust much of the available ingredients of the crops cultivated, and render this upper portion of the soil comparatively poor. Such lands where there is still a depth of soil that has never been broken, may be plowed an additional depth of five or six inches with an ad-

vantage equal to a field of virgin soil. For such lands, the trench or double plow is the proper implement. Upon a shallow soil, the labor is best performed with a sub-soil plow, following in the furrow of the common breaking plow.

When land is broken up with the trench plow, all the weeds and wild seeds may be so thoroughly buried as to render the labor of cultivation much less than on land that is plowed but a few inches deep.

FOREST TREES AND THEIR CULTIVATION.

At a meeting of the Farmers' Club, New York, Andrew S. Fuller, a practical horticulturist of Brooklyn, Long Island, gave a lecture on the subject of the culture of Forest Trees. It being a matter of more practical importance to the dwellers on our great prairies than to the farmers of New York, however important it may be considered there, we are pleased to condense a portion of it for our columns. Mr. Fuller stated, That the only place where a complete collection of American trees can be found, was in the parks of the city of Paris, France.

Many kinds of valuable trees are becoming very scarce, and he therefore recommended that all the choicest sorts of valuable timber trees should be planted upon many an acre in that vicinity that is almost worthless for any other purpose than for trees.

It is a mistaken idea that men must be professional nurserymen to grow forest trees.—Every farmer can grow them as easily as he can grow corn.

He spoke of the immense advantage of surrounding prairie farms with belts of forest trees. In many cases a crop of forest trees would be more profitable there than any other crop.

He then gave a most interesting account of the planting of forest trees upon the estates of the Earl of Fife, in Scotland. In some places, the trees were planted upon the sides of hills so steep that men were let down by ropes to do the work. How many situations of the same kind in this country might be planted with trees?

He related a fact given in a letter from the Sixth Earl of Haddington, which stated that his mother caused large bodies of forest trees to be planted; some of the land was a drifting sand when naked, and worthless for other cultivation.

Mr. Fuller said that he had grown seedling maples, to one year old, at an expense of $1 a thousand. He raised 40,000 seedlings upon the eighth of an acre, at an actual expense of $18. His method is to sow them in beds, three feet wide and one foot apart, covering the seed only half an inch deep. The plants must be carefully hoed, and kept clear of weeds. The plants can be transplanted at one year old to rows four feet apart, setting the plants two feet apart, trimming off the side branches and cutting off the tap roots. At two years old, several sorts of forest trees, thus treated, will be twelve or fifteen feet high in rich soil—then, every other tree may be removed to other situations. The hickory must have the tap root cut, to render the trees fit for transplanting. It will grow much more rapidly also, and so will several other sorts of trees by cutting the tap roots.

As the trees grow in the nursery rows, you may take them out until they stand eight feet apart each way, which gives 680 trees to the acre. What these would be worth, of course, depends upon circumstances.

The seeds of sugar maple ripen in Autumn, but do not germinate until Spring.

The seeds may be sown as soon as ripe, in beds; or mixed with moist sand in boxes and kept in the cellar, or out doors, as freezing does not injure them.

The American elm is one of the most ornamental trees, and of very rapid growth. The seed ripens the first of June, and should be sown as soon as ripe, and a portion will germinate at once, but the most of them not until next Spring.

All forest tree seeds appear to require to be covered very lightly. They germinate best when kept continually moist.

Where land is plenty, it is best to sow coarse seeds, such as walnuts, hickory-nuts, &c., in single drills, wide apart. This gives room for root-pruning, which should always be done the season before taking them up.

It is probable that several of our evergreen trees can be grown for profit, as well as ornament. It is certain, that many bare spots could be occupied profitably with some kind of forest trees, and their cultivation should be more thought of by our American farmers.

This is an important subject for discussion at meetings of fruit growers and farmers' clubs, among the Western settlers. We have so frequently referred to this subject in the *Valley Farmer*, that nothing further need be said to urge our friends to PLANT TREES.

UNITED STATES AGRICULTURAL SOCIETY.—This Society held its Annual meeting in the City of Washington, January 10th. The election of officers for the ensuing year: President Hon. Henry Wager, of New York; for Secretary Major B. P. Poore was reelected; also for Treasurer B. B. French.

LETTERS TO YOUNG FARMERS.

NUMBER ONE.

Young Men of the Farm:—We propose addressing a few letters to you through the *Valley Farmer* on important subjects, hoping to suggest some thoughts that may be seeds in your minds of still better thoughts, in the harvest season of your lives. We commence this work with a full consciousness of its importance. We feel that he who touches the springs of young power, is in a measure responsible for the result; that he who drops thoughts into young minds, is often answerable for what grows from them. Thoughts are, indeed, the seeds of future harvests. Our thoughts are our guides. They are the invisible springs of our action. We speak and move by their direction. To their subtle forces we yield an implicit obedience. "As a man thinketh, so is he." Give a man his thoughts and you control his life. To speak to a young man, therefore, is often to change his whole course of life. To give him a word of advice, sometimes sets the whole current of his thoughts in another direction. Only words of wisdom, which are like "apples of gold set in pictures of silver," should fall upon the ears of youth. Who ever essays to speak to them, let him do it reverently and kindly.

We shall speak too in the full view of the importance of your profession to society. We know that agriculture is the great harvest field of mind and muscle as well as of food. The trades and professions draw recruits from the farms. The bone and sinew of the country are born and bred in rural homes. The head of wisdom, the arms of strength, the feet of swiftness, the hand of art, are chiefly the products of farm life. Your profession is the great nursery of society, to which all trades and professions go for young scions of health and strength. Society would soon deteriorate and decay, were it not for the fresh supplies of blood and mind drawn from the rural districts. Trusting, therefore, that you will read in the spirit in which we write, we would in this letter point you to a *true manhood*, as the great goal of your ambition. Young men are ambitious. They will be. It can't be got out of them, without spoiling them. It is bred in their bones. It is their human inheritance; and they would be good for nothing without it. Ambition in itself is right. It is a spring of power. It is a mighty engine of tireless action in the human breast. We would not cripple it; we would not clip its wings. We would only direct it into proper channels and to objects wholly worthy of it. We would have it taught how and why to live. We would have it inspired with noble aims. In young men we would fire it with a love of a brave and true manhood. See how noble it is to be a true man; to sit enthroned in the imperial robes of a just and gracious character; to live above professional caprices, local prejudices, partizan biasses, and sectarian bitterness; to act a magnanimous part, to be honest, patient, sincere and just, whether society frowns or smiles. It is a truth, that beneath the skies there is no nobler thing than a true manhood. It is our best representative of the Divine. It is that high, honorable thing to which all men yield a hearty tribute of respect. It is that brave, manly bearing, which so dignifies and ennobles all true men. It is the manliness of a man; it is the nobility of character; it is the royalty of society. A true man is a king put him where you will. He is imperial in soul and life. He is above vulgarity of thought, or scurrility of speech. He is not moved by petty jealousies and small vexations. He rejects the indecent habits of the vulgar, and is a slave to no social custom. He shuns the inebriating bowl and the desecrating oath. He makes his appetites and his passions serve the great purposes of his life. He is neither a miser nor a spendthrift, a fanatic, nor a stoic; but a self-poised, modest, discreet and reliable man, whose intellect and heart are so happily blended that you know not which most to admire—his cool, correct judgment or his warm, genial spirit.

Young men have hot blood and quick impulses. They see life through the magnifying glass of the imagination. Their fancies are ardent and often lawless. The things they crave, take poetic forms in their minds. Their hopes are Elysian fields, their fears Tartarian gloom. They are prone to extravagancies. They catch at single ideas, and color the passing hour with their light. Youth is the poetic period, when ideas appear in twilight distorted and colored by the meteoric light of an inexperienced imagination. Young men should know this, and early learn the great lesson of self-restraint. Haste is their danger. They are over confident; too sure; too apt to spurn the wisest teachers; not willing to wait for wisdom to grow with their beards. They think they know best, and often rush in where angels walk abashed. This ardor of youth, this overconfidence, this recklessness, has ruined many a young man and robbed the world of many a promise of a rich manhood. Be not too fast. Too much speed at first often trips and loses the race. Be not too confident, it often breeds self-conceit—the meanest quality of a low mind. "Learn to labor and to wait," so will you mature your judgment, harmonize your thoughts, and lay the foundations of a true manhood. Your life will depend much upon a judicious beginning. With a noble purpose and a wise start, success is almost sure. But most depends upon the idea of manhood with which you start. If that is low and gross, your life will correspond to it. If that is true and noble, you will rise to its realization. No young man starts to be a clown and turns out a philosopher. In the long run, men generally come to be what they most want to be. The strongest desire within them lifts and molds the whole man to itself. He who aims to be only a bar-room rowdy, will not generally get much above his mark. He who takes on the burden of many evil or vulgar habits, will not rise easily to even common excellence. A bad habit is a friction among the wheels; a dead weight upon one's shoulder. To be a true man, the whole life should bend to this great purpose. Education, pleasure, profession—all should help to secure the noblest thing possible to mortal life. *

[Written for the Valley Farmer.]

PRACTICE VS. THEORY.

Farmers, as a general rule, want to know that a thing *has* been done before they are willing to try if *they* can do it. A good theory, well substantiated with strong arguments, is a good thing and a beautiful thing; but, at the same time, in order to make it acceptable to the masses, you must reduce it to *practice*; then, and not till then, can you induce practical men to take hold of it.

If you tell Farmer A. that by planting his young orchard *deep*, and piling in the manure around the roots, his trees will take a firmer hold, and throw out stronger roots: and then go on with your arguments to prove the assertion, he will be apt to tell you that he has seen that tried, and that the results were not what you say they will be. But, if you tell him that years ago when you set out your young orchard, you followed such a plan as this, viz: Where you wished a tree to stand, you dug over a space about six feet in diameter to the depth of nine inches, throwing the surface out on one side: then, throwing the next nine inches out on the other side, you again got into your excavation, and pulverized the earth to the depth of nine inches, making eighteen inches in all; then throwing your surface pile back, you put in a rich lot of chip-manure or wood-mold, on which you placed your tree; and, after straightening out every root, you packed the mold *firmly* around each of them, and in the interstices between them, where they join the tree, packing it *firmly* with the hand, I say, that if you should tell him that, after taking this course, your trees all grew *well*, and produced the *best* of fruit according to their kinds, he would be apt to tell you, "Well, that sounds like common sense; I'll come over and see your orchard before I set mine out; and, if I think it would pay to take so much trouble, I'm in." And, by the way, any man, that's just going to set out a few trees, it will pay him better than money out at 100 per cent. to take just so much trouble for every tree that he sets out.

Again, in raising cattle, sheep, hogs, &c. &c. you may tell a farmer that such and such a cross would produce such and such a result. You may give nature's laws, and all such things, ad-infinitum, he will be apt to ask you if you have *tried* it. But, if you tell him that by crossing the fine-wooled Merino with the large-framed native, the result is a sheep that combines, to a certain extent, the good qualities of both, viz: good quality of wool and large size of frame; that you have proved these results by actual experience—that is all he wants, he is ready to go and do likewise. Or, if you tell him that a cross between the Chester White and the Suffolk, will produce a hog that would combine the size of the one with the fattening qualities of the other, that you had proved it to a demonstration, he would think it would pay him to do the same. That makes me think!—I have heard people say, that the engravings we see of hogs, cattle, &c. were overdrawn. I would like such persons to call on Judge Lanham, St. Louis county, and see his cross between the above-named breeds of swine; he will be apt to say that they take the rag off of "the picters." And, if he don't go home and dream of spare (?) ribs and sausages, it will be because he don't permit his imagination to soar on Fancy's pinions. In fact, they look good enough to eat down as they run, bristles and all.

The way to make an agricultural paper interesting, is for its patrons to contribute to its columns. If you have a way of doing anything peculiar to you, and by which you have always succeeded well, just embody the main principles in a friendly letter to the editor of your paper. By so doing, you are conferring a favor on all your brother farmers, both those who read your paper and others also; for, if it possess merit it will be quoted.

Will not the patrons of the *Valley Farmer* (and their name is legion) do this thing for 1860? If they will, their paper will be the most reliable one of its class in the Union. In fact, to judge from the frequency of extracts from the *Valley Farmer* that we see in other agricultural papers, it is not far from that now.

Now, Messrs. Editors, we don't object to your giving us a good *theory* now and then, just for variety; but in order to make your journal what you seem bound to have it, viz: the *best*, give us some of your good things reduced to practice.

CHAS. A. FENN.

S. S. Bailey's Method of Raising Potatoes—His Criticism on "Old Firkin."

EDS. VALLEY FARMER:—I notice in the January number of the *Farmer*, an article entitled, "Old Firkin's mode of cultivating the Irish potato." Here is my mode for the same. Potatoes are of two classes, viz. early and late. I plant my early potatoes, just as soon as the season will admit, in the following manner: Have the ground well broken (good or new ground of course), turn two furrows together, with one-horse plow, plant the potatoes one in a place, about fifteen to eighteen inches apart, by striking in with a hoe, drop the potato in and cover about two inches deep.

"*After Culture.*"—Keep the weeds and grass down, but do not work too deep and close, after the vines are about ten inches high. They are ready to dig for table use by the middle of June, and fully ripe by tenth July. The late ones are cultivated just the same way, only not planted till middle of June; dug in October; each variety yields me about 200 bushels per acre.

Now, I must criticise on friend "Firkin's" mode. First, he does not tell you when to plant. That is a *very* important matter. Next he would imply that it is universally a good plan to plant one row around the corn-field.

I admit the advantages he claims for it, and, doubtless, it does well in Ogle county, Ills., as it will in most parts of Illinois. But if we, here in Missouri, adopt the plan, we will have gullies around our fields in a short time. The bare thing of the outside row being potatoes, means nothing; but his plowing to the gap, noon and

night, down the fence row, would lead the water there in spite of all we could do on our hill farms. And, by the by, the higher the hill, the better the potatoes, if the ground is good. Level ground is not good for potatoes here, from the fact that all level upland in Missouri is wet.

Wheat looks *very* bad here. Some say it is entirely dead; but I think, with favorable weather, we *may* have a fair crop yet.

Peaches are all killed, with two exceptions, within my knowledge. One orchard is situated on a peak of Missouri bluff 300 feet high, and only about half the buds are killed; and a single tree stands by the P. R.R. north side of bluff, just at high-water mark, and they are all good.

Yours, Respectfully,
S. S. BAILEY.

Dundee, Mo.

REMARKS.—Friend Bailey could not have read "Old Firkin's" article very carefully, or he would have observed that he did not recommend planting "one" row around the corn-field, but a number of rows. "Old Firkin" said, "I have for years planted my potatoes at the ends of my corn, because a horse may turn on the potato ground, and if, accidentally, he steps on a vine, it is of no consequence," &c. Again he says: "It is also a good plan to plant a few rows of potatoes next to division fences or the public highway, for, by so doing, you remove the temptation from the cattle or horses that may pasture thereon." Neither does he recommend cultivating or plowing one row all the time; but "down one row of potatoes and back in another;" and of course, cultivating all planted in this manner, and not one row at the expense of all others.—[EDS.

CATERPILLARS.—With a little watchfulness and care in searching for caterpillars' eggs, and destroying them before the leaves of fruit trees put out, and before the worms hatch, you thus save the trees from injury, or a greater amount of labor in killing the worms in the nest after they hatch, and when other work is pressing. A little practice will enable one to detect them on the small branches of the apple and cherry trees. The eggs are deposited endwise in a little bunch around the limb, and very ingeniously covered with a kind of gum or cement to protect the embryo from injury by the weather.

TO DESTROY THISTLES.—About the time the flowers appear, cut them down to within an inch or two of the ground with a bush-scythe or hoe, and repeat the operation as often as their deformed heads make their appearance; and, in a short time, you will enjoy the satisfaction of seeing them disappear entirely. Such is my experience. R. B. SMITH.

Walnut Grove, Ky.

Premium Corn Crop in Indiana for 1859—Importance of Sub-soil Plowing.

We had just finished writing an article on the importance of "TRENCH AND SUB-SOIL PLOWING," which appears in the present number of the *Valley Farmer*, when we saw in an Ohio paper an account of the extraordinary crop of corn, which took the first premium offered by the State Agricultural Society of Indiana. The mode of preparing the land, and the subsequent cultivation is so nearly that which we have repeatedly recommended as the best of all others, and the result is so encouraging, that we give the substance of the article as furnished by a correspondent.

The corn was grown in Switzerland county, Indiana, near Vevay, by J. W. Wright. As a further proof of the correctness of this method of preparation and culture, we will state that Mr. Wright took the first premium also for 1858. The crop in 1859, for which the present premium was given, five acres of which averaged 184 bushels and 32 lbs. per acre, and ten acres averaged 174 bushels per acre; the best acre out of the five produced the astonishing quantity of 214 bushels. This farm is situated on the Ohio river; part of it is bottom land and overflows. Some of this land has been in corn sixty years in succession. The past year he raised 34 bushels of wheat per acre from some of the land, it being the first crop of wheat ever taken from it. But the method of cultivating the corn is the point to which we wish to call particular attention. It is as follows:

He sub-soil plows his land once in three years, with the best plows made for that purpose, drawn by a famous team of oxen that shows that they are fed on premium corn, and by an owner who knows how to raise premium crops and keep good cattle. The oxen weigh 3,600 lbs. and follow directly after the common plow, breaking up from *fifteen to eighteen* inches deep.

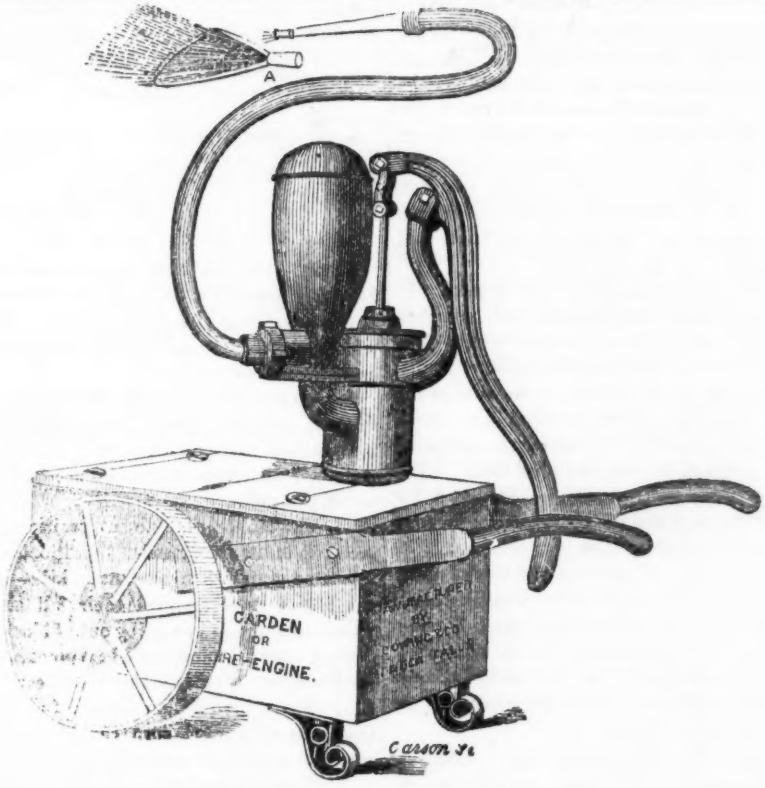
After the corn is gathered in the autumn he does not allow his fields to be trampled by any kind of stock. At convenient times he rolls the stalks down flat, lengthwise the rows, and plows them under in February, if the weather is favorable. At corn planting time he harrows his ground without any further plowing, plants his corn with the Cherokee Corn Planter, the rows being three feet three inches apart, with three grains in a hill.

He cultivates his corn one way with a double shovel plow, the shovels being about four inches wide, plowing from *seven* to *eight inches deep* the first time, and as near the corn as possible.

The second plowing is about *four* inches deep, and the third and last, two inches, *leaving the ground as level as possible*, and taking special care *not to cover the brace roots*, which are very essential to the healthy growth of the crop. These brace roots threw out an infinite number of fibrous roots—the feeding apparatus of the corn plant. A few years ago Mr. Wright purchased a farm near him, which had been so badly managed, that the occupants could not raise more than fifteen or twenty bushels of corn per acre. The first year after the purchase he sub soil plowed it and planted it in corn. The result was 84 bushels per acre; and in 1858, after the second sub-soiling, four years after it came into his possession, he raised the premium crop of over 130 bushels per acre.

Here are accounts of repeated crops from the same land, and all by the same mode of cultivation, differing materially from the course followed by the great majority of farmers, and these crops *six or eight* times greater than the same land yielded under the ordinary mode of tillage practised throughout the country, and with the exception of the labor of running the sub-soil plow, the cost of cultivation in no way exceeds that of the ordinary method.

We have practised both methods of cultivating this crop, and as the result of experience we have always recommended *deep and thorough plowing, planting with the drill, and dressing with the cultivator*, or what is equivalent in this case, the double shovel plow and *level culture*. Here we have the whole system demonstrated, and the returns of the two methods of culture compared. If this does not afford the arguments and the proof sufficient to induce the most skeptical to give it a fair trial, it is in vain to attempt to bring about improvement in this or in any other branch of farming. We hope we shall hear further from Mr. Wright.



GARDEN, OR FIRE ENGINE.

This Cut is a representation of a Garden or Fire Engine, which for its power, capacity and usefulness, cannot be surpassed. From the size of the Air Chamber, sufficient power is obtained to enable one man to throw a steady stream of water to the height of 50 feet perpendicularly, thereby rendering it a desirable article as a protection against fire; for washing windows of second and third stories of buildings, carriages &c.

A Garden Engine with a Diffuser or Sprinkler used in orchards and gardens, to throw soapsuds on the young trees, will destroy many kinds of vermin likely to destroy the fruit, and be an invaluable addition to the implements of the nurseryman and horticulturist. It is manufactured by Cowing & Co. Seneca Falls, N. Y.

Seeding Timothy on Prairie Sod—Cranberries—Seedling Fruits.

Guilford, Nodaway Co. Mo. }
Jan. 16th, 1860. }

Eds. Valley Farmer:—I would like to get information through your very valuable journal, on the following subjects:

1st. I want to know the best mode of seeding our wet bottom prairies to tame grass (Timothy or Red Top); whether the prairie should be broken or not, or can it be seeded by feeding hay over it? The difficulty is to get a good bottom after breaking the prairie.

2nd. I want to know if the cranberry can be successfully cultivated in North-west Missouri, or not? And the mode of propagating, and where seed can be had?

3d. Will the fruit propagated from the seed of the May Duke cherry, and the Early York peach, produce fruit as good as the parent?

Yours truly,
Bartlett L. Cook.

We reply to our correspondent's first question, by stating that, in order to secure the best and most profitable meadow, the sod should first be subdued, and then sow the seed, if of Timothy, in the fall, say in September if the season is favorable. Wet prairie should be drained, if possible, in order to have a good meadow. On wet, undrained land, Red Top will succeed better than Timothy, though it is less valuable for hay. Red Top may be sown in the Spring.

2nd. Cranberries require a cold climate. In northern Indiana they succeed well, and they may in the location of our correspondent. We have tried them in the neighborhood of Louisville, Ky., but failed entirely on account of the hot sun, although we had succeeded in the north to the greatest perfection before we ever heard of the attempt to cultivate this fruit. The ground, *if a marsh*, should be covered a few inches with sand and the plants set out in rows a foot or two apart, or seeds may be sown. The surest method is to procure the plants either from the natural marshes, or what is better, from those who are cultivating them. In western New York, several persons are cultivating improved seedlings, but their post-office address we have forgotten. Their advertisements are frequently in the papers.

3d. The May Duke cherry, may produce its kind, if grown from the seed. In planting, the seed should never be allowed to become dry. They may be planted as soon as gathered, or it is better to keep them in moist sand until the following Spring. Peaches grown from seed more generally produce fruits inferior to the parent than its like; one in a thousand might be superior, but seedlings are so uncertain that fruit growers generally prefer to perpetuate good kinds by budding.

Timothy Meadows—Prairie Grass—Osage-Orange Hedge.

Eds. Valley Farmer: Will some of the readers of the *Valley Farmer* answer the following questions through its columns, to wit:

1. Will any of the tame grasses take on unbroken prairie?

2. Will Timothy seed sown on sod corn in August, and gotten in by a brush, make a *good* and permanent Timothy field—that is, will simply breaking the sod of prairie be a sufficient preparation of the ground for Timothy seed?

3. At what time should prairie grass be cut in order to afford the most nutriment for stock.

4. What corn is the earliest and most profitable to plant, in view of our short seasons and sometimes late planting, in consequence of wet springs and late breaking of prairie; and what farmer can furnish said corn for seed, his post office address, and nearest depot on the Hannibal and St. Joseph or North Missouri Railroad?

5. What wheat is the earliest and most hardy?

6. As timber is scarce in many places, will the Osage Orange hedge be a good substitute for fencing? Will it stand the climate in 39° North latitude?

Respectfully,
New Westernman.

Linn County, Mo. January 12, 1860.

Reply.—1st. We have in part answered the foregoing questions by another correspondent in this number of the *Valley Farmer*. Cultivated grasses will not readily take until the prairie grass is subdued.

2nd. If the sod is tolerably well rotted, Timothy may take, and finally form a meadow; but, if other land that has been subdued can be had, it should be chosen in preference to the half rotted prairie.

3d. The proper time to cut prairie grass, to secure it in its most tender condition, and, at the same time when most nutritious—is when the blades have attained their full size, and when most of it is just going out of blossom.

4th. Under-draining is the best preparation for land to admit of early planting and early maturity. But to the question of seed: In Cleveland, Ohio, an early seed corn can be had at the seed stores; but we cannot give the names and post-office address of any particular farmer who has an early kind for sale.

5th. The Osage Orange, no doubt, will make an excellent hedge in the climate where our correspondent resides, *with the requisite care in planting and trimming*. But these conditions are so generally neglected, that we despair of ever seeing living fences take the place of dead struc-

tures, until absolute necessity compels farmers to follow the requisite instruction so frequently given for their management. The Osage Orange and other plants, are well adapted to the purpose of hedges; but they must not be neglected when the time of cutting arrives.

The following article was read by Dr. Morse, at a late meeting of the Meramec Horticultural Society:

THE VALUE OF CARROTS.

At a recent meeting of this Society, during a discussion of the subject of the proper cultivation of the young orchard, I mentioned the carrot as being an excellent crop for that purpose, and very valuable as food for horses &c. To the latter opinion, especially, members dissented. As there was no opportunity at that time for discussing the point, I offer here a few ideas and facts in regard to it.

The carrot is a valuable crop to cultivate in the young orchard, because, if properly done, it secures deep working and thorough pulverization of the soil, at the very period when the orchard most needs it, viz: about the commencement of the growing season. It secures during the forepart of the season a frequent stirring of the surface soil so as to keep it clear of grass and weeds, and break up the crust which forms after rains; very important cultivation for the young orchard.

As the season becomes advanced, the carrot tops nearly cover the ground, thus acting favorably, as a sort of mulch, protecting the ground from the scorching rays of the sun, and better than a mulch of straw or litter, because, of a cooler nature, the better preserving the dew point, and condensing the moisture of the atmosphere at night. The roots of the carrot penetrate to a great depth, loosening, deepening, and rendering more porous the soil. A vast amount of the small fibrous roots are left to decay in the soil, thus enriching it. At the period of gathering in the Fall a furrow should be plowed close along one side of each row, when the carrots may be readily pulled by hand and the tops cut off to remain on the ground. This secures a valuable and necessary Fall working for the orchard, and leaves to decay a not inconsiderable amount of green, vegetable manure.

The carrot readily yields from 500 to 600 bushels per acre, and often as high as 1000 bushels. In nutritive matter which it actually contains, it is unequalled by any other vegetable except the potato; and in consequence of the amount of pectic acid which it contains, and by which it assists in the more perfect digestion and assimilation of other articles of food, it is, doubtless, much more valuable for stock feeding than any other vegetable. Such is the opinion, I believe, without exception, of farmers who have tried them extensively, considering them more hearty and nutritious, without producing the laxative effects which are often perceived in the potato. When used as horse feed, they communicate to the animal a looseness of skin, and a rich, beautiful glossiness to the hair. The *American Farm Book*, says: Horses thrive remarkably on them, and some judicious farmers feed them as a substitute for oats. From their medicinal properties, and the healthful effects resulting from their regular but moderate use, they would be advantageously purchased at the same price as oats, or even corn, if they could be procured no cheaper. They are good for working cattle, and unsurpassed for milch cows, producing a great flow of milk and rich yellow cream. Sheep and swine greedily devour them, and soon fatten, if plentifully supplied.

The *Working Farmer* says: "Carrots have a value far beyond that which can be attributed to the mere nutriment they contain, for in addition to what they furnish in this way, they contain a quantity of pectic acid, and this carries the property of gelatinizing the vegetable and animal matters held in solution, and thus enabling the peristaltic motion of the intestines to seize hold of their contents, so that digestion of all matters of food is perfected by the presence of carrots. It is for this reason that a bushel of carrots and a bushel of oats are better for the horse than two bushels of oats; not from the nutritious matter contained in the carrot, but, in part, from the power of the carrot to cause all the nutriment of the oats to be appropriated in the making of muscle, instead of part of it being evacuated in excrement. This action is true in regard to all the vegetable substances which go to make up the variety of food for animals, and the very instinct of every animal gives evidence of this truth."

There is no doubt, that the carrot is among the most important and remunerative crops embraced in our husbandry, for the uses of the farm; and it is to be regretted that its cultivation is so entirely neglected in many portions of the west.

L. D. Morse.

Every Thing in its Proper Time.—The secret of success in farming, as in everything else, is in doing things always at just the right time. There is hardly a day in the year that something cannot be done to facilitate some necessary work. The reason why some men are always behind with their work—their planting or sowing too late—their crops overtaken by weeds—their grain and grass too ripe before they are harvested, is because they put off too many things for to-morrow, that should be attended to to-day. Every day brings its duties and labors upon the farm, and he who allows the labor of one day to crowd upon another, is always a little too late with everything, and he at once concludes he was born to bad luck. "A stitch in time saves nine."

Railroads and the Milk Trade. — The quantity of milk sent to the city of New York from Orange county, from seven stations on the Erie Railroad and including the Newburgh branch, amounts to 5,359,839 gallons annually.

THE FARMER ON HIS FEET.

NUMBER ONE.

EDS. VALLEY FARMER:—I propose to write several Essays for your pages. I shall aim to put the farmer upon his feet—in other words, to try to create in him a proper appreciation of his status among men. And, to begin; *he ought to be an intelligent man.*

We all know what intelligence means. A man need not be a classic, learned in ancient lore; needs not burden his brain with the *dead past;* but he must be full of the *living present,* to be an intelligent man.

The past comes to us in dream-awakening whispers— the present talks to us in facts and figures. In the one we read the epitaphs of dynasties and nations; in the other, we are brought in contact with men and their enterprises. Why should a man, who has mastered his old dog-eared Dillon, be ignorant of current events? Ignorant, perhaps, of those things wherewith he busies his hands.

"What! make me a scholar? I, who have never darkened the door of a college in my life am required to be a scholar, or a dolt!"

Neither, my dear Cincinnatus. I do not require you to be a scholar, technically; but I ought to require you to be an intelligent farmer. I do not require you to be an intellectual *omnibus;* but you should be a stanch, and well-trimmed intellectual family *coach.* In your "pride of place," I would have you shine. I would not have you be a dolt anywhere. Is that great mass of practical knowledge, laid away in your memory, nothing? Is that not intelligence of the very first grade? By a little careful sorting out, by a proper methodizing, it would become intellectual burnish. You need the aid of science, that's all.

Like virtue, intelligence brings its own reward. Rational pleasure and personal prestige are to intelligence, as the shadow to the pine. They go together.

Did the farmer never go beyond his neighborhood, his practical skill in husbandry might give him character enough, at least, to gratify his vanity: but let him travel, how would it be with him then? Not able to carry his nice farm with him, nor qualified to converse intelligently about it—this would be his situation, if he did not understand the phenomena of his profession. There are aids enough within the farmer's reach, to give him immunity from such a strait as this. All plowing and sowing and reaping, cannot do it; he *must* read. Making hay while the sun shines, is good; but reading while it rains, makes it better. The professions have their books, and their votaries read them as a necessity. Husbandry has its books, not to grace a library only, but to be to the farmer what Blackstone is to the lawyer—his fort, professionally. They should be to him, a "joy forever."

I shall talk plainly—unostentatiously to my brother farmers; we are a plain, unostentatious class of people. We like a practical man, and when we find the practical and the intelligent harmonizing in the same man, we like that man almost passionately. He is to us a pride, an example, a gladness.

I take it for granted, that the farmers in receipt of this periodical, are practical men, as far as their practice goes; but we would have their practice widened out, embracing new aids and elements. For these, we must look to *agricultural literature.* In this we will find one mind thinking, discovering, analyzing for the millions, as is the case in all the professions. A resort to this literature, is the only way to become an intelligent farmer. This will exercise the brain just as successfully, pleasantly, and profitably, as though it were the law or the medical literature. Proper mental effort, in the right direction, cannot fail to make a man intelligent. Intelligence is an achievement, not a grant. Mother wit is not intelligence.—The one, may boast of its good judgment and fine repartee, the other feels and enjoys the sweet burden of its rich repository; the one may be apt, the other is always on hand, as a ready aid; the one is a boast, because it is a gratuity, the other is a pride, because it is the result of a laudable effort; the one stays at home and may be negatively happy, the other goes abroad, gayly enjoying the true "feast of fat things." An intelligent mind is a bliss forever.

Of Sir James Mackintosh, it has been said: "His mind was a vast magazine, admirably arranged; everything was there, and everything in its right place. . . . . It would have been strange indeed, if you had asked for anything that was not to be found in that immense storehouse. The article you required, was not only there; it was ready; it was in its proper compartment. In a moment it was brought down, unpacked and displayed."

No one expects every farmer to be a Sir James Mackintosh; still, we do insist on finding very many intelligent Mr. Smiths among them.

Pope lied. "A little learning is *not* a dangerous thing." It is a safe and good thing; but every jot added to it makes it that much safer and that much better. It is a safe thing, because it wants to fortify itself with more—a good thing, because, like charity, it blesses him that gives and him that receives.

The intelligent farmer is not only a pride and pleasure to himself—he's a guide to others. One watch set right will do to try many by; but on the other hand, one that goes wrong, may be the means of misleading a whole neighborhood. Such is the result of example.

It is said of a man, that money in his purse, will credit him—learning in his head will adorn him: and that both, in necessity, will serve him. Go where he will, a man's intelligence will serve him. All he has to do is to show it, and temper it with prudence. It will be the more sure to serve him, as it is a power in him. Wisdom will tell him how to apply it.

This is the age of intellect. Mind is contending with mind in lawful battle. The farmer should arm himself for the contest. In the merchant he must battle with the "tricks of trade;" in the legislator, with the ambition that may oppress; in the preacher, with the eloquence that may mislead. He should study the laws

of production and consumption, of trade and commerce. The world must be fed, and he must produce the wherewith to feed it. The best and most successful manner to do this, is a study peculiar to him. His practice must be based upon correct theory, to insure success.

But to wave the farmer's *status* among men of intelligence, we will see how he can meet his *interest* without a scientific knowledge of the things to which he has put his hand.

Yonder field does not produce as it once did. There is something wrong. It is sick. Its healthy equilibrium is gone. It needs a doctor. It is well-cultivated—well-manured, even, but the harvest is slim. Practical art has again and again failed. Time and labor bring small rewards to hardy toil. Well, we go to our literature. There we learn the ingredients of the soil we have so vexed for almost nothing. We go to our memory. We remember, that year after year, a certain crop has been grown upon that field. We go to chemistry, and learn just what ingredient our crops have drawn from our field too largely. Is the lesson not demonstrated? *put back what has been too lavishly taken away.* Restore equilibrium, *Ex uno dece omnes*—from one case, learn all—*the necessity of being an intelligent farmer.*

I see my brother farmer gathering his feet up as though he was going to try to get upon them. We'll wait and see. N. M. H——G.

Rock Hill, Mo.

The Apiary.

HINTS FOR THE MONTH.

BY J. W. QUIMBY.

Within the last few years, the interest felt by the mass of the farming community of our country in the cultivation of the honey-bee, has rapidly increased; and, in view of the consequent demand for reliable information, I propose to give in the columns of the "Valley Farmer," some seasonable hints for the management of this insect. Without further preface, then, some important particulars in spring management shall receive attention.

If bees have been wintered in the house, they should be set out on the first still and sunny day in March, or even earlier if the weather will admit, unless there should be a light snow on the ground. Set but few out at a time; and these at a distance from each other—say ten feet or more, to prevent their mixing together. After the bees of the first have exercised themselves, as they will on being removed from a dark room to the bright sunlight, others may be placed between them, and so on until all are in their places.

One of the greatest troubles with bees in spring, is robbing; and there is nothing in any part of bee management requiring more close attention and good judgment, than to decide when this is going on. Fighting is not unusually mistaken for it; but nothing is to be feared so long as bees defend themselves. The danger is, when a weak stock unresistingly yields. Any unusual activity about such a hive is suspicious, though not conclusive unless long continued; for the young bees will sometimes fly out very thickly. These, however, are of a little lighter color; and the practiced eye will distinguish them at once. If the hive is really being robbed, the bees that issue from it will appear larger than usual, and fly more heavily. Instead of moving off in a direct line, they will turn their heads toward the hive, and fly in circles to mark the locality, to be able to return for another load. Sometimes robbers may be detected, by sprinkling bees issuing from a suspected hive with flour, and then watching to see if they enter others in the apiary. Another means of deciding in doubtful cases, is to notice whether any hive continues its labors after sunset. If so, such unwonted industry is to be taken as almost positive proof of criminality. If you mistrust a hive is being robbed in the middle of the day, contract the entrance at once, so that only one bee can pass in at a time. This will sometimes put an effectual stop to it; but, if it should fail, when evening comes or early the following morning, remove it to a cellar or dark room, and let it remain for two or three days. It may then be returned to its stand; and, generally, with safety. If re-attacked, treat it again in the same manner. It will often happen, that on removing a hive from the reach of robbers, that they will attack the next nearest stock; but, if strong and the entrance be contracted, as above directed, no danger need be apprehended.

HONEY DEW—WHAT IT IS!

EDS. VALLEY FARMER:—In any European journal, it would create surprise if the nature of the so-called honey dew admitted of a doubt or dispute. Starch or grape sugar is an essential substance of plants, as much as carbon is, of which sugar is formed in conjunction with acids and salts. Flowers and fruits contain this sugar in an eminent degree, as also the juices of the maples, sugar canes, millets, grasses, beets, and thousands of other plants. Animal blood receives its sugar from plants, as it is a life ingredient of both kingdoms.

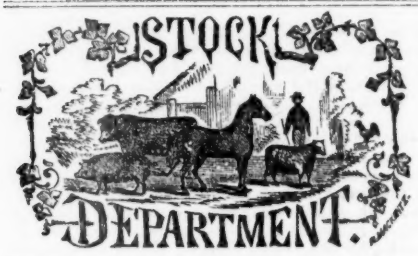
"Liebig says: a surplus of saccharine matter, more than leaf and bud consume, will be exuded upon the surface of the leaves and bark. Certain diseases of trees and plants, the so-called Honey Dew, are obviously produced by a disproportion in the quantity of furnished nitrogen free, and nitrogen containing nourishments. The exudations of sound, healthy plants of mannit, gum, and sugar, cannot be attributed to any other cause."

"This case appears analagous to the digestion in the human organism; if, to every part of the body, there shall be restored what it loses by respiration and secretion, there must be offered to the organs of digestion a certain proportion of nitrogen free, and nitrogen containing substances, accompanied by certain mineral salts, which metamorphose them into blood. Is the quantity of the offered nitrogen-free substances in surplus, they will then be either used to produce fat, or they go through the organism unaltered."

So far says Liebig—besides it is well-known that saccharine matter is not of a volatile nature, that the air cannot contain it in solution—how then can it rain or dew down from the atmosphere even upon the dusty ground? The days of the Jews, when they imagined that manna, or mannit fell from heaven for their especial use and merit are past; that same mannit or gum exudation of the mimmosa and other plants is found and gathered yet in great quantities in the same and other similar climates of the globe, so the honey dew or the exudation of sugar. Bees do not produce one atom of honey, but are only the carriers of the starch sugar exuding from plants and their fruits. The so-called honey dew is in substance the same in the flower as it is on the leaf. Bees and myriads of other insects lick it up and exist on it. That rain washes it from the leaves is very plain, as water dissolves sugar. Give the bees plenty of honey dewed foliage, and they will make plenty of the best honey without sipping a single flower.

The fibre called silk is in the mulberry leaf; the milk and cream of the cow, the oily parts of the grass, clover and herbs she eats, as is the wool on the sheep; or the honey the sugar of plants. The animal body only digests them, thereby complicating certain combinations of simple elements.

XUM



Solidified and Condensed Milk.

Science is ever busy in revealing to us some new channel to human comfort and convenience. While attending the exhibition of the the American Institute, New York, last fall, we examined specimens of solidified milk, prepared by a Company organized for the purpose of supplying families, travelers by sea and by land, and those residing where pure, fresh milk cannot be obtained. Within the last few years, considerable efforts have been made, with more or less success, to prepare milk in a solid form, retaining all the essential qualities of fresh, unadulterated milk; but the article referred to, prepared at the milk-works, near Amenia, Dutchess county, New York, if we may judge from the numerous certificates furnished by the Company, is all that can be desired in this respect. We have before us a report to the New York Academy of Medicine, by the standing committee on public health and legal medicine; and also of the American Medical Association. It appears that these committees have examined these works, and witnessed the process of manufacture; and from their report of twelve printed pages, we make the following extracts:

"As an article of food, under all circumstances of life, civilized and barbarian, in infancy and in age, in sickness and in health, *milk* is at once a luxury and a necessity; and it is remarkable, that, being such, it, of all sources of man's sustenance, should be the most susceptible of spontaneous decomposition; and this, not so much from the influence of the atmosphere, or any other external agent upon it, as from its own innate tendency, arising from its complicated and peculiar organization—a few hours, and in warm weather even a few minutes, being sufficient to change its constituent character. Any method to preserve the integrity and nutritive qualities of milk, so that it may be available at any time as diet, must, therefore, if successful, be regarded as among the most interesting and valuable gifts of science to humanity.

"It is a matter of no little satisfaction, therefore, to your committee, to be able to state to the Academy their belief, derived from a very thorough examination of the whole subject, that the difficulties to the consummation of this most desirable object, have at length been entirely overcome; and that, henceforth, we may under all circumstances, in any position, and at any time, be supplied with pure milk, in a very convenient form.

"The process by which these difficulties are overcome, is equally ingenious and simple. It has been fully subjected to our critical examination; we have traced the milk of the rich pasturage of Dutchess county, from the udder, to its final conversion into solidified milk; and we find it, in all its stages and appliances, to be based upon a thorough knowledge of the chemistry and dynamic tendencies of the natural fluid."

The process by which this object is attained, is not alluded to by the committee; but they assert that, "It is nothing but the solid constituents of pure milk, combined with a little less than an equal part, by weight, of white sugar; that it contains no other foreign substance; that the various solids of the original fluid are preserved intact, even the butter globules being unbroken; that it is readily and perfectly soluble in water, and when it is so dissolved in proper proportion, it is in fact milk, as it were secreted by the cow, with the sole exception of the sugar which accompanies it. In this form, the milk contains all the sugar usually required either in tea or coffee. This article has been in use in New Mexico and California, and on numerous voyages at sea; and it is reported by those who have used it, including the late Dr. E. K. Kane, on his Northern Exploring Expeditions, that it contains in a concentrated and perfect form, all the constituents of pure fresh milk. In appearance it resembles a purely white, granulated substance, something like pulverized starch.

Another process of preparing milk in the country, for the supply of cities with a pure article in a condensed form, has been adopted; and, it is said, with very marked success. An establishment of this kind is in operation in Litchfield county, Connecticut, and owned by Mr. Gail Borden. This process consists in reducing the milk to about one-fourth of its original bulk, by evaporation. This gives it something of the consistence of thick cream. It is thus sent to the markets of New York and Boston; and is said to keep sweet longer than

milk fresh from the cows. The *Homestead*, in giving an account of the establishment of Mr Borden, describes the method of treatment as follows:

"The milk is strained and put at once into ten-gallon, open-top cylinders; and, after standing in a tank of ice-water till deprived of animal heat, it is heated up to 190 degrees, by setting those cylinders on heaters in a tank of water heated up to this point. A creamy scum rises, which is removed; and this is found to contain butter to the amount of one pound to 2,000 quarts of milk. This unavoidable loss, is the only deterioration which the milk suffers. A small portion of hard, indigestible, viscid albumen, attaches itself very firmly to the sides of the heaters. Freed from these, the milk is again strained; and, at the temperature above stated, transferred to the *condenser* on the floor above. This is a globe of iron, fitted with a steam jacket for the lower half, and provided with a steam-pipe, coiling several times about within. Through each of these, the pipe and the the jacket, cold water may be at any moment injected, to prevent boiling over, or to prevent the milk adhering to the sides, which is the case if they are not chilled. This condenser is capable of holding about 1,000 to 1,200 quarts. Connected with the condenser or vacuum pan, is a barometer, to show the degree of exhaustion, and a thermometer, to mark the temperature, which is kept at about 150 degrees. The exhaustion is effected by an air-pump; and the exhaust pipes pass through cold water to condense the steam arising from the milk. The air which, when the exhaustion first begins, is thrown off from the milk, is, strange as it may appear, of an exceedingly disagreeable smell—a sort of cow or cow-yard odor, which is so offensive that special pains have been taken to conduct it away from the house:—this, notwithstanding the great pains to have the milk clean and pure. The milk is thus reduced to one-fourth its volume, and effectually freed from tendency readily to ferment or sour from any impurities, solid or gaseous, it may have contained; and is capable, after being diluted properly, of answering all the purposes of the best milk. The cream will rise as usual, and butter may be made; and the milk will show itself possessed of all the properties of fresh milk."

These various improvements, we trust, will have a tendency to furnishing the inhabitants of cities with a pure article of milk from the country, in the place of much of the vile, adulterated stuff, from diseased swill-fed cows, that are kept in large numbers in and about large cities.

BREEDING, AS AN ART.

NUMBER FIVE.

In order to continue and perpetuate the good qualities which, by the skill of the breeder, have been engrafted upon the native or natural condition of a breed of animals, it is indispensably necessary that the same discriminating judgment, in the selection and management of breeding animals, which has accomplished the present improvement, be continually exercised to prevent deterioration. We often hear it said, that certain breeds of animals have been so long and carefully bred, that their acquired qualities have become permanently fixed, and the impression is conveyed that their present condition will be maintained, if left to themselves. This is a grave mistake, and many an unsuccessful breeder can safely attribute a great portion of his "ill luck," to the fact that he has entertained and acted upon this erroneous opinion.

Perfection has always been represented as resting upon the top of a high mountain, the ascent of which grows more and more difficult as we advance. Along this mountain side there are no wide table lands, where broad and level fields assure the toiling traveler, he may securely rest. He who would pause in the ascent, must hold with strong hands upon the load he carries, or it will roll back until it reaches the level plains below. The nearer he has approached the summit, the longer time he will be occupied by his abandoned load in descending to its original level; but its descent will be none the less sure and certain. The improvement of a breed of animals, no matter how far it may have been carried forward, or how judiciously it may have been conducted, will surely roll back, whenever the art and skill which gave it progress shall cease to operate. Individuals, therefore, who avail themselves of the progress made by others, by purchasing animals which, by judicious, unremitting, and long continued effort on the part of the breeders, have been brought to a high state of perfection, should remember that care and skill are indispensable to the maintenance of their stock in its present improved condition.

If all who engage in breeding animals were perfectly qualified to conduct such a business in the best manner, and would devote themselves earnestly to it, the present high price for the best breeding stock could not long be maintained. But the truth is, comparatively few

bring to the work that knowledge, skill, and untiring energy which is indispensable to success. The consequence is, in the course of a few years, their stock instead of improving in their hands, as under proper management it might have done, has in fact deteriorated, and resort must again be had to the flocks and herds, or stables of those breeders, whose motto has ever been "Excelsior;" and who, by constant, patient, and well-directed effort, have succeeded in still further improving the character of their stock; hence we may readily discover why it is that the skilful breeding of animals has so long proved very profitable. And so long as comparatively few men will apply themselves with earnest, patient skill to the task of making some improvement, we can see no reason why the skilful breeder may not reap as much profit in the future, as he has in the past, from the prosecution of his business.

This instead of proving a source of discouragement to the breeder, should rather stimulate him to more diligent and studious application; for if he can succeed in producing superior animals, he can confidently rely upon obtaining a "paying price" for them.

BLOODY MURRAIN.

A subscriber in Adair Co. Mo. having lost several cattle by this disease, asks for a remedy or preventive. The cause of this disease is still involved in mystery. We have met with no authority that satisfactorily defines it. It seems to have its origin in the liver, attended with severe inflammation, and generally terminates in death. Numerous remedies have been proposed, many of which are absurd. It is difficult to prescribe for a disease without first determining its cause and character.

It has more generally been attributed to leeches, that have been swallowed by the animal while drinking. In most cases when the livers of cattle that have died with this disease have been carefully examined, animals having some resemblance to the common leech have been found alive in the liver, and these have led to the common impression that they have been swallowed, and after arriving at full size, in their action have led to a rupture of the blood vessels, causing inflammation and speedy death. Cases were examined a few years since by John H. Klippart, Esq. Secretary of the Ohio State Board of Agriculture, an intelligent and close observer of nature, who came to the decided opinion that the animals found in the liver were not of the genus *Hirudo*, or common leech, but differed materially from it in its character and organization—illustrations of both of which he gave. From this examination, so clearly set forth, it is probable that the animals found in the liver are parasites peculiar to that organ, the origin of which is no more mysterious than that of numerous other parasites that are common in different parts of domestic as well as wild animals.

As a remedy, blood-letting is generally resorted to, and various drugs and purgatives administered; but we are not acquainted with a single instance, where the disease was unmistakably the bloody murrain, that they proved of any avail. The disease prevails most in low, wet, miasmatic situations, and we can, therefore, more safely recommend a preventive than cure. Cattle kept in good condition, upon high, dry, wholesome pastures, with salt and dry wood ashes given them once a week, or kept in covered boxes where they can have access to it at pleasure, we think, will not be subject to the disease.

Animals attacked should be removed from others of the herd at once, and if they have frequented low, wet pastures, where miasma prevails, they should be changed to more healthy situations.

ADVANTAGE OF SHELTERING ANIMALS.—From the experiments of an English farmer, it has been demonstrated that sheltered sheep eat one-third less of linseed-cake, and two pounds less of turnips per day. And yet, notwithstanding this, the increase of those housed, as compared with those that were not, was as *fourteen to nine*. An equal, if not greater advantage, is derived by sheltering cattle.

GREEN RYE FOR BREEDING MARES.—A subscriber has sown a field of rye for his breeding mares, but has since been told that if they are allowed to feed upon it they will not "take," and asks us whether this is a fact.

It is said, that green rye and particularly green clover, in their most succulent stages, produce such an effect upon the bowels and the animal system generally, as to render breeding sometimes uncertain. If we had mares from which we wished to breed valuable colts, we should prefer to give them shorter and more substantial pasture, with hay and other solid food, and reserve the rye or clover in the earlier part of the season for other stock. We know nothing, however, from personal experience of the fact that green pasturage is thus injurious; yet, from the well-known effects of such food upon the animal secretions, we have no doubt they are liable to the accident referred to. We shall be pleased to publish any facts touching the subject, from the experience of any of our readers.